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SUBSTITUTE PAGES

sheets and in the boundary regions outside of the paper dimension. In the event that the recording medium is printed on both sides, toner can moreover loosen from an already-printed side with which the recording medium lies on the transport belt and contaminate this. A transport belt contaminated with toner in turn contaminates subsequent recording media, which is not acceptable.

The present invention is based on the object to specify a cleaning unit for cleaning of a transport belt of the previously cited type, with which the transport belt can be thoroughly cleaned of toner.

This object is achieved according to claim 1 via a cleaning unit that has an abrasion element (said abrasion element arranged transverse to the running direction of the transport belt and lying on this) that is set to abrade toner located on the transport belt and a toner capture reservoir to capture the abraded toner. Advantageous developments are specified in the further claims.

In tests, the use of very hard materials for the abrasion element has proven to be advantageous, both concerning the thoroughness of the cleaning and the wear of the transport belt and of the abrasion element itself. Abrasion elements made from ceramic, whose wear was by far less (due to their hardness) than, for example, that of a likewise tested abrasion element made of spring steel, have proven to be particularly advantageous. In a particularly advantageous embodiment, the abrasion element is made from an aluminum oxide ceramic that represents a very good compromise between high wear durability and advantageous production costs.

In the production of the ceramic it is advantageous to grind the initial materials to a grain size that is smaller than or equal to that of the toner particles. In the event that individual grains loosen from the ceramic abrasion element, the cavities created are small enough that no toner particles pass through them and therefore possibly remain on the transport belt in spite of the cleaning unit.

transport belt facing away from the abrasion element. In an advantageous development, the felt is arranged with positive fit in a metal receptacle. It is thereby prevented that the felt is loosened or shifted by the transport belt.

As mentioned above, the inventive cleaning unit comprises a toner capture reservoir to capture the abraded toner. The captured toner can, for example, be transported with a screw transport from the toner capture reservoir into a waste toner reservoir present anyways in an electrographic printer or copier. The transport device necessary for this for the captured toner into [sic] the waste toner reservoir present anyway is, however, relatively elaborate and costly. Therefore, in a preferred development such a transport is foregone and instead of this the capture reservoir is designed such that it can be removed from the printing or copying device. The capture reservoir thus simultaneously serves as an independent waste toner reservoir.

The toner capture reservoir can preferably be sealed in the printer or copying device. Upon removal of the capture reservoir from the printer or copying device, no toner can then be spilled.

In a preferred development, the toner capture reservoir is electrically conductive. The toner (normally electrostatically charged) can thereby be discharged in the toner capture reservoir and does not tend to accumulate at components located in the environment of the capture reservoir and charged opposite to the toner.

When the toner conveyance system is simultaneously used as a waste reservoir, it is important that it can be produced particularly cost-effectively. The toner capture reservoir is preferably comprised of plastic that can be cost-effectively processed. The toner capture reservoir is thereby preferably produced in a vacuum deep-draw method which enables a small material consumption and low production costs.

Claims

1. Cleaning unit (24) for cleaning of a transport belt (18) for transport of recording media (14, 20) in the transfer printing region (16) of an electrographic printer of copying device,

with an abrasion element (26) (arranged transverse to the running direction of the transport belt (18) and lying on this) that is set to abrade toner (22) located on the transport band (18)

and with a toner capture reservoir (30) to capture the abraded toner.

2. Cleaning unit (24) according to claim 1, in which the abrasion element (26) is comprised of ceramic, preferably of an aluminum oxide ceramic.

3. Cleaning unit (24) according to claim 2, in which the initial materials of the ceramic have a grain size that is smaller than or equal to that of the toner particles.

4. Cleaning unit (24) according to any of the preceding claims, in which the abrasion element (26) is designed as a cuboid-shaped abrasion bar.

5. Cleaning unit (24) according to claim 4, with a mounting device (38) in which the abrasion bar (26) can be set in four different positions,

whereby the four positions differ from one another by a rotation of the abrasion bar by 180° around its longitudinal axis and/or its transverse axis.

6. Cleaning unit (24) according to claim 5, in which the mounting (38) has recesses (46, 48) that prevent a contact of the longitudinal edges (36a, 36b, 36c, 36d) of the abrasion bar (26) with the mounting (38).

7. Cleaning unit (24) according to claim 5 or 6, in which the mounting (38) comprises a receptacle (40) in which the abrasion bar (26) is set with positive fit and a clamping plate (42) with which the abrasion bar (26) is clamped fast in the receptacle (40).

8. Cleaning unit (24) according to any of the preceding claims, in which a flexible support element (28) for the transport belt (18) is provided on the side of the transport belt (18) opposite the abrasion element (26).

9. Cleaning unit (24) according to claim 8, in which the support element (28) comprises a felt (32) lying on the transport belt (18).

10. Cleaning unit (24) according to claim 9, in which the felt (32) is arranged with positive fit in a metal receptacle (34).

11. Cleaning unit (24) according to any of the preceding claims, in which the capture reservoir (30) can be removed from the printer or copying device.

12. Cleaning unit (24) according to claim 11, in which the toner capture reservoir (30) can be sealed in the printer or copying device.

13. Cleaning unit (24) according to any of the preceding claims, in which the toner capture reservoir (30) is electrically conductive.

14. Cleaning unit (24) according to any of the preceding claims, in which the toner capture reservoir (30) is made from plastic.

15. Cleaning unit (24) according to claim 14, in which the toner capture reservoir (30) is produced in a vacuum deep-draw method.

16. Cleaning unit (24) according to any of the preceding claims, in which guide grooves (52) in which a cover (54) can be inserted to seal the toner capture reservoir (30) are formed on the toner capture reservoir (30).

17. Cleaning unit (24) according to claim 16, in which the guide grooves (52) are formed by down-turned sections of the edge (50) of the toner capture reservoir (30).

18. Cleaning unit (24) according to claim 16 or 17, with an engagement section (58) at which the toner capture reservoir (30) can be gripped upon its removal from the printer or copying device and that is height-displaced relative to the guide grooves (52), such that it undercuts the inserted cover (54).

19. Cleaning unit (24) according to any of the preceding claims, in which longitudinal and/or transverse ribs (64, 66) are formed in the toner capture reservoir (30).

20. Cleaning unit (24) according to any of the preceding claims, with a microswitch that scans whether the toner capture reservoir (30) is correctly arranged in the printer or copier.

21. Abrasion element (26) for abrasion of toner from a transport belt (18) for transport of recording media (14, 20) in the transfer printing region (16) of an electrographic printer of copying device, which abrasion element (26) is comprised of ceramic, preferably of an aluminum oxide ceramic.

22. Abrasion element (26) according to claim 21, in which the initial materials of the ceramic have a grain size that is smaller than or equal to that of the toner particles.

23. Abrasion element (26) according to claim 21 or 22 that is designed as a cuboid-shaped bar and that has four longitudinal edges (36a, 36b, 36c, 36d) that are designed to abrade toner.

24. Toner capture reservoir (30) for capture of toner in an electrographic printer or copier that can be sealed in the printer or copying device and that can be removed from the printer or copying device.

25. Toner capture reservoir (3) according to claim 24 that is electrically conductive.

26. Toner capture reservoir (30) according to claim 24 or 25 is produced from plastic and in a vacuum deep-draw method.

27. Toner capture reservoir (30) according to any of the claims 24 through 26, in which guide grooves (52) in which a cover (54) can be inserted to seal the toner capture reservoir (30) are formed by down-turned sections of its edge (50).

28. Toner capture reservoir (30) according to any of the claims 24 through 27, with an engagement section (58) at which the toner capture reservoir (30) can be gripped upon its removal from the printer or copying device and that is height-displaced relative to the guide grooves (52), such that it undercuts the inserted cover (54).

29. Toner capture reservoir (30) according to any of the claims 24 through 28 in which longitudinal and/or transverse ribs (64, 66) are formed.

30. Method for cleaning of a transport belt (18) for transport of recording medium (14, 20) in the transfer printing region (16) of an electrographic printer or copying device,

in which an abrasion element (26) (arranged transverse to the running direction of the transport belt (18) and lying on this) abrades toner (22) located on the transport band (18)

and a toner capture reservoir (30) captures the abraded toner.

31. Method according to claim 30, in which the abrasion element (26) is comprised of ceramic, preferably of an aluminum oxide ceramic.

32. Method according to claim 30 or 31, in which the abrasion element (26) is designed as a cuboid-shaped abrasion bar and can be set in a mounting device (38) in four different positions,

whereby the four positions differ from one another by a rotation of the abrasion bar by 180° around its longitudinal axis and/or its transverse axis.

33. Method according to any of the claims 30 through 32, in which the capture reservoir (30) can be removed from the printer or copying device and can be sealed in the printer or copying device.